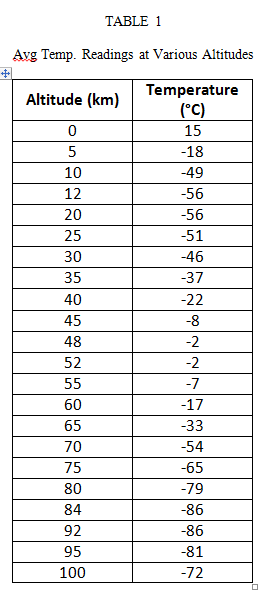
**OBJECTIVE:** Students will model how the atmosphere can be divided into layers based on how temperature & pressure change with altitude, by making a graph.

**DIRECTIONS:**

1. Table 1 contains the average temperature readings at various altitudes in the Earth’s atmosphere. Plot this data by creating a graph on graphing paper – use the altitude (Y axis) and temperature (X axis) **max and minimum values from the data tables** to scale your graph appropriately (hint: you should not put 0°C at the any edge – see figure 6 pg. 480 in textbook). Connect the temperature data points using **straight lines**. Be careful to plot the negative temperature numbers correctly. This profile provides a general picture of temperature at any given time and place; however, the actual temperature may deviate from the average values, particularly in the lower atmosphere.

2. Next, **label a second X axis scale, below temperature**, as Pressure in millibars (mb) **from 0 mb (bottom left limit) to 1000 mb (bottom right limit)**. Label every 100 mb on the scale. Use Table 2, showing pressure at various altitudes, to plot the data on your graph. Connect the pressure/altitude data points with straight lines in a different color than your temperature line made in step #1.

**Table 2**

**Avg. Pressure Readings at Various Altitudes**

|  |  |
| --- | --- |
| **Altitude (km)** | **Pressure (mb)** |
| **0** | **1000** |
| **2** | **800** |
| **4** | **640** |
| **6** | **500** |
| **8** | **400** |
| **10** | **300** |
| **12** | **250** |
| **14** | **200** |
| **16** | **150** |
| **18** | **110** |
| **20** | **90** |
| **22** | **75** |
| **24** | **60** |
| **26** | **45** |
| **28** | **20** |
| **30** | **10** |
| **32** | **5** |
| **34** | **1** |
| **36** | **0** |

3. Place the following words on your graph in the correct locations: **troposphere, tropopause, stratosphere, stratopause, mesosphere, mesopause, thermosphere and ozone layer**. Draw a dotted line across the graph, parallel to the X-axis at each boundary (pause) between the atmospheric layers.

4. Research the heights from which both Joseph Kittinger and Felix Baumgartner skydived from and the year in which each performed their jump (look up using internet). Label these altitudes on your graph and use some special symbol/character to denote each jump. (for example, use a small Air Force logo for Kittinger and a small Red Bull logo for Baumgartner).

5. Research and briefly describe some characteristics of each layer. What occurs there? What would it be like to be in each layer without any special equipment or suit? Could we even survive in each layer? How would our body react physically to being in each layer? How high can any creature go into the atmosphere? Use the internet and your understanding of the atmospheric layers to write a short paragraph that covers this material. Write this on the back or your graph or type out and print.

**Questions (answer on back of graph!):**

1. What is the basis for dividing the atmosphere into four layers?

2. Does the temperature increase or decrease with altitude in the:

troposphere \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stratosphere \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

mesosphere \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ thermosphere \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What is the approximate height and temperature at the:

tropopause: \_\_\_\_\_\_\_\_\_\_\_\_km \_\_\_\_\_\_\_\_\_\_\_°C

stratopause: \_\_\_\_\_\_\_\_\_\_\_\_km \_\_\_\_\_\_\_\_\_\_\_°C

mesopause: \_\_\_\_\_\_\_\_\_\_\_\_km \_\_\_\_\_\_\_\_­\_\_\_°C